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ABSTRACT

The Study Commission on Undergraduate Education and the Education of Teachers is charged by the U. S. Office of Education to concern itself with the reforming of undergraduate education as it relates to the education of teachers. Part of the process of reform is likely to involve the federal government's granting of money to institutions of higher education, to state agencies, or to schools. The essays in this book look at the relationship between the reform of federal systems and the reform of local systems. They suggest several principles: (1) Security in federal funding fields is likely to be related to the prestige of a field and its having arrived at a routinized and relatively secure method of winning information and advocating policy. (2) If the federal government is interested in encouraging institutions each to have a unified institutional mission and if it is interested in creating humane higher educational communities, then its procedures for funding ought to reflect and support that concern through the modification or abolition of the training-grant system. (3) As the federal government develops its interest in permanent institutional change, it must grant money in such a way that its funds tie into the full permanent governance systems of institutions so as to secure their long-term committment to the goal for which funds are given. (Author/HS)

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NOTHING BUT PRAISE:

Thoughts on the Ties Between Higher Education and The Federal Government

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With an additional essay by
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INTRODUCTION

The Study Commission on Undergraduate Education and the Education of Teachers is charged by the U.S. Office of Education to concern itself with the reforming of undergraduate education as it relates to the education of teachers. Part of the process of reform is likely to involve the federal government's granting of money to institutions of higher education, to state agencies, or to schools. Recently Representative Edith Green and Assistant Secretary of Education (HEW) Sidney Marland have pointed to the necessity for reforming of internal procedures in the Office of Education. The essays in this book look at the relationship between the reform of federal systems and the reform of local systems. They suggest several principles:

1. Security in federal funding fields is likely to be related to the prestige of a field and its having arrived at a routinized and relatively secure method of winning information and advocating policy. The study of education of teachers and of children does not yet have such a method. However, better contracting and reviewing can provide a measure of stability.

2. If the federal government is interested in encouraging institutions each to have a unified institutional mission (as the Newman Commission has suggested that it ought to), if it is interested in creating humane higher educational communities, then its procedures for funding can, and ought to, reflect and support that concern through the modification or abolition of the training-grant system.

3. As the federal government develops its interest in permanent institutional change, it must grant money in such a way that its funds tie into the full permanent goverance systems of institutions so as to secure their long-term commitment to the goal for which funds are given.

4. The granting of money "is" education. How money is transferred shapes how children, adults and institutions learn. As Boulding's essay points out, "Knowledge—what we see, what we allow as input—grows toward the more highly valued elements in the potential image."

This book is intended for the use of those granting and receiving money as part of a contract for the reform of education, particularly undergraduate education for teachers.

Paul A. Olson, Director
Study Commission on Undergraduate
Education and the Education of Teachers

NOTHING BUT PRAISE

PREFACE

This book is dedicated to Carol Eagan Pino. Her concern and her love extended even to those days—now all in the past—when the work stalled and I became an ogre-in-residence. A good wife—especially one who grows younger and more beautiful each year—is a blessing beyond price.

* * * * * *

Although I have had this work in mind since I left Washington in 1966, two recent events contributed to its completion. Under Oakland's enlightened leave policy for faculty and administrative personnel, I was awarded a sabbatical for the spring and summer of 1972. Of equal importance was the creation in 1971 of the Study Commission on Undergraduate Education and the Education of Teachers funded by the U.S. Office of Education and directed by Professor Paul Olson of the University of Nebraska. With the encouragement and support of Paul Olson and his associate director, Larry Freeman, I have spent my sabbatical completing this book, rather than revising course notes and tackling the general reading which accumulates each academic year. I have even postponed learning the art of the sand wedge.

I am grateful to a number of colleagues who were kind enough to provide comments on early drafts. The detailed critiques prepared by Philip Y. Howard of the Oakland University library staff and Lawrence Sullivan of *The Detroit News* deserve special recognition.

My thoughts and my prose were sharpened by conversations and correspondence with a number of old friends, including Louis T. Benezet, President, State University of New York at Albany; Laszlo J. Hetenyi, Dean of the School of Education, Oakland; G. Philip Johnson, Dean of Graduate Studies, Oakland; Frederick W. Obear, Academic Vice President and Provost, Oakland; Donald D. O'Dowd, President, Oakland; Thomas Overmire, Executive Director, Michigan Academy of Arts and Sciences; Joanne Pino, Teaching Assistant, Political Science, University of New Hampshire; Dicron Tafralian, Grants Administrator, Oakland; Amitendranath Tagore, Professor of Chinese, Oakland; and D. B. Varner, President, University of Nebraska.

It's impossible and perhaps impolitic to name the many capable and dedicated people in the federal government with whom I have worked over the years. I have attempted to reflect their views of the federal enterprise and ways in which it might be improved, especially when their positions coincide with mine.

Ava Kerr, long-time executive secretary of the Office of Research and Instructional Services at Oakland University, has done her usual beautiful job of rapid and flawless transcription of my thoughts from tape to paper and from draft to draft. Without her loyal and expert assistance, I would still be poring over draft number four.

Lewis N. Pino
August, 1972

SETTING THE STAGE

This series of essays is an attempt to understand the complex relationships between the federal government and higher education and, particularly, the implications of this partnership for undergraduate education, including the education of prospective elementary and secondary teachers. My objec. is not so much to write a history of the activities of various agencies as to examine patterns of federal funding and to suggest ways in which they might be modified to improve their effectiveness and efficiency. The motive force is my belief that the quality of our educational systems determines, in large measure, the strength of our society.

I will be speaking principally to those currently in the federal agencies engaged in management of grant and contract programs of interest to higher education as well as to those faculty and administrators on college and university campuses who deal extensively with the federal government. Those who would like to become more deeply involved in proposals and grants are invited to listen.

Many of the questions we will explore have gained the attention of members of Congress, largely through the efforts of staff members associated with various Congressional committees dealing with educational policy and practice. The officials of the Washington-based professional societies and educational associations must be included, since the experience and the concerns of this group often parallel quite closely those of agency officials, Congressional staff members, and those academic administrators who have had some experience, directly or indirectly, with Washington.

The composition of the potential audience suggests that the problems of establishing appropriate relationships between the federal government and higher education absorb the energies of a continuum which begins in the colleges and extends into the professional societies, the educational associations, the federal agencies, and the Congress. It is my hope that relating my experiences and attempting to interpret them will encourage a great

many others to advance suggestions for the improvement of the important links between government and education.

While I am not qualified to discuss in detail the relationships between the federal government and the elementary and secondary schools, there are growing numbers of people, particularly in the larger school districts, who do deal with the federal government and who are very well aware of the need to improve both the permanance and the rationality of federal grant programs. While I expect that a good bit of what I will say in succeeding pages may be applied in principle to the pre-college scene, school administrators and teachers must make that transposition on their own.

My observations and suggestions are based on more than 25 years of involvement in federal funding for educational purposes. After I was supported for several years as an advanced undergraduate student and a graduate student under the GI Bill, an Office of Naval Research contract awarded to the University of Buffalo funded the last two years of my Ph. D. program (1948-1950) in organic chemistry. Following six years of teaching and research in a fine chemistry department at Allegheny College, I accepted the post of Assistant Dean of the College and Associate Professor of Chemistry at Colorado College, where a series of summer institutes for experienced high school teachers of science and mathematics was being initiated by Professor of Mathematics, Joseph Leech, with the full support of President Louis T. Benezet. I taught in the first institute (1956), which was funded by private sources. I directed subsequent institutes which grew in size and scope as the National Science Foundation assumed support. Beginning in 1957, we initiated and ran, at Colorado College, NSF-funded summer training programs in science and mathematics for unusually able high school juniors.

Spending Federal Dollars

In 1959, I became an official of the National Science Foundation and was responsible during my seven years there for several

programs at the precollege and undergraduate level. During this period I lived each day with the problems of giving away federal dollars while, as Dr. Harry Kelly put it, "trying to do as little damage as possible."

In 1966, I returned to Academe at Oakland University, a state-supported institution in Michigan opened in 1959, where my duties as Director of Research and Instructional Services and Professor of Chemistry have involved me in many enterprises. In my role as chief liaison with the federal government, I have seen our volume of federal project support (not including student aid or construction monies) increase from about $400,000 in 1966 to approximately $2 million in 1972.

Over the last six years, I have served as reviewer and consultant to NSF and have worked on several studies of higher education—most closely with Dr. Paul L. Dressel of Michigan State University and his associates on an NSF-supported study entitled, *Impact of Federal Support of Science on the Publicly Supported Universities and Four-Year Colleges in Michigan*,[1] and in an ESSO Foundation-supported study of departmental structure in selected universities. The results of the latter study have been published in a volume entitled, *The Confidence Crisis*.[2] On occasion, I have even taught—most recently a course on Science and Public Policy, offered in the winter of 1971-72 in Allport College, one of three cluster colleges at Oakland.

A comment is in order on the title of the book. One of the most delightful stories I came upon while at NSF concerned the effort on the part of a Ford Foundation executive to write the perfect denial letter—perfect in the sense that it gave the proposer no hint as to the reasons his proposal had been denied and no handle by which he could attack the review process. The letter he

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[1] Paul L. Dressel and Donald R. Come, *Impact of Federal Support of Science on the Publicly Supported Universities and Four-Year Colleges in Michigan*, National Science Foundation, 1969.

[2] Paul L. Dressel, F. Craig Johnson, and Philip M. Marcus, *The Confidence Crisis: Analysis of University Departments*, Jossey-Bass, Inc., 1970.

produced, after much thought, consisted of a single sentence. "We have nothing but praise for your proposal."

I think of that line each time I enter certain Washington offices. In the typical case, I find an overworked federal official sitting at his desk surrounded by piles of proposals approved for funding by review panels. The problem is that there is simply not enough money available to provide support for more than a small percentage of those good-to-excellent requests. Many of these proposals represent functioning projects at colleges or universities which, as far as can be determined, have been running well and doing good things for periods of up to ten or twelve years. With dollars simply not available, the program officer is using his life's blood to write recommendations for denial. His "nothing but praise" letters suggest that it is time for careful examination of the project support system with those who have seen the view from both sides of the desk having some special responsibilities.

Somehow or other, the energies required by the project system, both on the part of the proposer and his home institution and by the federal official and his agency, have become excessive. Surely there are options to be explored which may increase the return on federal dollars invested in educational institutions and decrease the time and talent devoted to non-productive effort. Even if the current fiscal crunch were to disappear tomorrow, the system would still need to be overhauled.

It may be useful, then, to pull together the views of current federal programs held by those who deal with them. We may have done less that we might have with federal dollars, in part because representatives of higher education know too little about the extensive interaction between Washington and the campus which has developed so rapidly since 1946. I recognize and applaud the massive efforts being made by the Carnegie Commission and others to correct this situation. However, I'd like to add my own thoughts to the agenda.

Preservice Training Needs

I am convinced that we have not committed enough talent or enough money to the conscious improvement of education at all

levels. It is essential that we identify and support many approaches to educational quality. It is equally important, if it can be established that improvement of education is a national priority, that a good deal of effort be put into *institutional* development and *institutional* improvement. For instance, I support the view that concentrating on improving the capabilities of individual institutions to train new generations of elementary and secondary teachers is more effective educationally and more efficient financially than concentrating, as we have in the past, on improving the capabilities of teachers already in service. While inservice training programs for teachers have done a great deal of good over these past twenty years, one must agree that a comparable number of dollars invested in institutional improvement of the preservice education of teachers would, by now, have transformed elementary and secondary education in a way which even unlimited dollars for inservice training cannot. One must acknowledge that a simple trade-off will be difficult: experienced teachers love institutes the way National Rifle Association members love unregistered guns.

The problems of education, particularly at the precollege level, are no longer and probably never have been simply a matter of recruiting enough teachers. The goal should be creating a better fit between the temperament, training, and capabilities of mentors and the needs and aspirations of students. Sensitivity to the varying cultural and socio-economic backgrounds of students is of particular importance. We have always had problems in dealing with children who are "different." Thus, when the first generation of children of immigrants from central and southern Europe were moving into and out of public schools, cultural differences were ignored rather than considered sources of strength. Black, brown, and red students are getting similar treatment.

A necessary, but not sufficient, requirement for improving institutional flexibility to respond to the changing needs of society is more stable and more equitable financing for education. At the elementary and secondary level, we are probably moving away from the local property tax to a pattern something like that pro-

posed by the Fleischman Commission in New York State, with increased reliance on a graduated income tax. This approach offers many advantages, including more uniformity in support per student across each state and ultimately across the country. Undoubtedly, the development of state-wide standards of performance applied to individual schools would be accelerated in the process.

In higher education one may hope to see, in time, funding from both public and private sources which recognizes that various kinds of instruction have different costs. I have in mind here not only the differences in cost per student as the student moves from freshman year to senior year and into graduate and professional programs, but also the real differences in cost among laboratory programs, field-oriented programs, and those which are primarily classroom centered. Reliable estimates of these variations may be difficult to develop but are badly needed. There are signs that the National Center for Higher Education Management Systems at Boulder is finding bases for determining realistically the costs of education at various levels and in various disciplines.

Let us now turn to examining the fabric of federal programs so that we may postulate ways in which useful changes might be made.

THE CURRENT SITUATION

There are hundreds of program units scattered among the federal agencies which deal in one way or another with the higher education community and/or with the schools. Each fund-granting entity, if it has been in operation for any length of time, has its own objectives and practices and, importantly, its own academic constituency. The constituency, as we shall see, is much more than a clientele. Not only is it served by the program unit through grants, but it is a prime source of staff and advice for the agency as well as a principal means of communication.

We can bring focus to our discussions of federal efforts by sorting grant programs into categories based on announced purposes. Nearly all federal activities of direct interest to the educational world fit into one of the following seven groups, so that we can proceed to examine results and suggestions for improvement by classes of federal efforts rather than having to deal with hundreds of individual programs.

1. Project support for research. The research grants issued by agencies such as the National Science Foundation (NSF), the National Institutes of Health (NIH), the Office of Naval Research (ONR), the Atomic Energy Commission (AEC), the Air Force Office of Scientific Research (AFOSR), and the National Endowment for the Humanities (NEH) are the strongest tie between federal government and higher education. The mechanisms for federal support of research on the campus grew out of the World War II cooperation between the scientific community and the military establishment, which has been extensively documented by Daniel S. Greenberg in his *Politics of Pure Science.*[1] The current pattern of interactions in basic research between the federal government and higher education was initiated by the founding of the National Cancer Institute (NCI) in 1937, grew during and after World War II, and then went into orbit in 1958 with the firing of Sputnik I.

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[1] Daniel S. Greenberg, *The Politics of Pure Science,* Plume Books, 1967 (revised, 1971).

Grants are awarded on the basis of detailed external and internal review of proposals submitted by individuals or small groups. These "unsolicited" requests differ sharply from proposals for contract research support which normally are prepared in response to well-defined research needs of mission-oriented agencies which are purchasing applied research results and developmental efforts. While some universities are engaged in classified contract work, with rights of access and publication restricted, unclassified work under grants is much more common.

The federal official responsible for the typical research grant program has earned his membership in a particular academic guild. His credentials include a number of years on a university faculty after completion of the Ph. D. in a particular specialty within the field he is now funding. His ties to the academic world are such that he can return to academic life as a research man or in some other reasonably respectable role—if he can find a university whose salary scale matches that of the Federal Civil Service.

Since his constituency is small and well defined, reaching it is a relatively simple matter. Most of his grantees will gather at the annual meeting of their professional society; many of them will call or write him or stop in to see him during the course of a year; and a fair number of them will assemble on his request for meetings of study sections or review panels and advisory conferences on the state of research in a particular area. The program director and his constituency form a guild, an "invisible college" in the classic sense, in that they will tend to share research results and professional gossip via correspondence, exchange of preprints and reprints, telephone calls, and conversations at professional meetings.

The number and kinds of institutions represented in a typical research constituency in the sciences tends to be quite small. All, or nearly all, will be large universities; the total number will probaby not exceed fifty.

There are indications that the dispersal of scholars in the humanities is greater than it is in the sciences. One of the effects

of federal research funding has been to concentrate research scientists into larger departments with access to complex equipment, more complete library collections, and larger numbers of advanced students. Th research grant units in the National Endowment for the Humanities are likely to be dealing with colleges as well as university faculty members, since there are few humanistic counterparts to "Big Science."

2. Fellowship and trainee programs. Almost as soon as research grant programs were initiated, federally funded fellowship programs were established in the sciences and engineering. Over time, support for promising graduate students and postdoctorals has been extended to include most academic disciplines. It is important to note that fellowship awards go to the individuals rather than to institutions.

The program director and his professional staff generally come from the ranks of university faculties, and the permanent constituency available for advice and for review of applications is drawn from a relatively small number of university departments heavily involved in graduate education and in research.

The distinction between research grants and the various categorical devices for supporting graduate students is by no means a clean one. Many research grants, particularly in the experimental sciences, include support for graduate students as research assistants. In most agencies, in fact, graduate student support is more commonly provided through individual research grants than by means of fellowships. The distribution of supported graduate students in the university can be quite uneven if the bulk of external funding for research goes into a few sub-specialties within selected schools and departments.

Over time, students follow the flow of research grant dollars in a way which can work against institutional plans for the development of graduate offerings of the university. The effects on students and their careers can be illustrated by the fact that more than half of the Ph.D.'s in physics produced in the last two decades are specialists in high-energy physics. The current dis-

proportion between national needs for physicists in this subspecialty and the number of capable and well qualified young scholars in this area can be traced to well funded federal research grant programs (largely at NSF and the Atomic Energy Commission) which have been unable—and probably unwilling to separate support of research on the nature of the fine structure of the nucleus from support for the training of the next generation of physicists.

In partial response to the distortions created by research grants, some agencies have offered support through awards based on proposals not from individual scholars but from groups of academic departments. Selection of a specified number of graduate students is thus turned over to the institution so that stipends may be awared in line with local priorities and local availability of qualified students and qualified staff. The traineeship award tends to be more useful to a university than individual fellowships and individual research grants, even though research grants and fellowship awards carry more status. Graduate students supported directly through research grants and individual fellowships congregate in selected departments within a relatively small number of institutions. Traineeship grants (as well as awards with different names but similar purposes) issued by NSF, NIH, and USOE have improved the geographical and disciplinary distribution of graduate students while respecting the right of graduate schools to have a greater voice in determining their own individual futures.

3. Support for group training. By the mid-1950s, a number of programs had been established offering training opportunities to groups of teachers at the elementary, secondary, community college, and college levels. While a few of these programs are research-oriented (e.g., Research Participation for College Teachers, at NSF), most offer instruction to teachers seeking to improve their grasp of new subject matter. The first National Defense Education Act (1958) and subsequent legislation have extended assistance, previously concentrated in science and mathematics, into non-science areas. However, retraining opportunities for precollege teachers of humanities, arts, and social studies and for

community college and college teachers in all disciplines continue to be limited.

Operating a federal program of this sort poses special difficulties, since the homogeneity that one finds in, say, a research grant constituency and staff concerned with molecular biology, simply doesn't exist when one is dealing with training programs for experienced teachers. With the responsibility for teacher education, both preservice and inservice, dispersed fairly widely on the individual campus and with all of the levels and subspecialties within teacher education, one has to deal with a number of clienteles rather than a unified constituency. A group-training grant operation usually has a multi-disciplinary program staff which must have lots of time before it can come to agreement on practices and policies. That time is difficult to find, especially in the first few years of program operation.

Even well constructed program announcements and guidelines tend to be interpreted in various ways by those seeking to gain support for a particular kind of training operation. As a consequence, policy manuals and guidelines for proposal preparation have a way of becoming more involved each year. A great deal of care and restraint is needed if the goals and the procedures of the programs are to be well defined and understandable.

Decisions on grants to be awarded are difficult to make since they must rest primarily and, in fact, almost solely on the proposals submitted by competing groups. Some reviewers will know nothing about many of the institutions applying for support. Instead of dealing with, say, forty like-minded departments in forty universities across the country, the program staff is faced with perhaps 1200 institutions, most of them relatively small colleges with little experience in asking for federal support of any kind. Picking out the best projects for support under these conditions is difficult.

One can cite examples of training grant programs for students at various levels (e.g., Head Start, Upward Bound, Summer Science Training Programs for high school students) and for

other groups. It is sufficient for our purposes to note that the problems of program operation are similar to those associated with the training of groups of teachers.

4. Cooperative school and college programs. There are a small number of programs in the federal government, notably Title III of the Elementary and Secondary Act and the Cooperative College-School Science Program of the National Science Foundation, which provide inservice training opportunities for experienced teachers in conjunction with support for planned improvements in courses and curricula in the local schools. These programs deserve more attention than they have gotten because they provide means for developing the sort of relationship between school systems and institutions of higher education which can serve as a basis for continuing self-renewal, both in the schools and in the colleges and universities. While Title III requires that grants be made to school systems, and NSF specifies that they be made to colleges and universities, both programs expect that there be careful planning before an award is made. National Science Foundation insists that the schools be involved in the planning, while the Office of Education will accept proposals which show no evidence of involvement on the part of an institution of higher education. Both program units would agree, however, that the most effective projects are based on a strong belief that both the schools and the cooperating college can contribute to and can benefit from joint ventures.

The staffing and clientele pattern is complex. Communicating with institutions and participants, getting reliable, reproducible evaluation of proposals and operating projects, and insuring adequate academic and fiscal control pose immense problems.

As a consequence, educational improvement programs, especially those which support cooperative efforts, are particularly vulnerable to criticism. Federal agencies and their state-level counterparts are not as experienced in the processes of making and monitoring educational improvement grants as they are with the simpler research and research training mechanisms. Staffing these programs is more difficult and the results of staff recruit-

ment less predictable than when one can depend on a well defined guild.

One must not assume that these programs are unimportant because they are difficult to administer. Rather, I am stressing the fact that great care is needed in recruiting and training staff at both the agency and the local operating level, and that a good deal of attention must be paid to developing and protecting rational guidelines on matters of policy and practice.

5. National course content improvement. Local modification of educational practices has been stimulated by the work of some small inter-institutional groups (sometimes formed under the aegis of the professional societies) which have developed and tested improved instructional packages largely, but not solely, for the elementary and secondary levels. We have seen over the last twenty years a progression of national course content improvement efforts, usually well funded and well staffed, moving from physics and mathematics to chemistry, biology, engineering, and earth sciences and then to the behavioral sciences and the humanities. These inter-institutional groups, some supported in exploratory stages by private foundations, have in nearly every case gotten the bulk of their support from federal agencies such as the National Science Foundation, the Office of Education, and the National Endowment for the Humanities.

New and different packages of instructional materials have been produced and tested for almost every discipline; at the elementary and pre-school level several imaginative multi-disciplinary approaches have been proven useful. Many of these study groups have reached the point where their work has been completed and the results distributed in forms directly useful to students and teachers.

This sort of national approach to course content improvement has shown that experienced college and university faculty and experienced elementary and secondary teachers can work together to prepare effective instructional materials. The value of calling on expert consultants to deal with specialized areas such as media use, testing, and evaluation has also been demonstrated.

6. Institutional development and support. A few federal programs offer developmental help to two-year and four-year colleges and universities seeking to increase the quality of teaching and learning in a particular setting. Support has been given for the improvement of instruction within individual graduate or undergraduate units, the strengthening of relationships between two-year and four-year colleges, and the development of institutions currently "not in the mainstream of higher education." Generally, awards cover the transitional costs of moving from one pattern of instruction to another deemed to be better, with the understanding that the federal government will be a partner only during the change-over and that funds required for continued operation of the improved program will be provided by stable local sources.

Programs of this sort can be found within agencies such as the Office of Education, the National Science Foundation, and the National Endowment for the Humanities. The Office of Management and Budget (OMB), the President's budget-makers, recently killed off some of the oldest developmental programs dealing with graduate education in the sciences. Apparently, OMB believes that improving the quality and visibility of a graduate program increases its output of students so that, in a time of Ph.D. manpower surpluses, efforts at upgrading should be reduced.

One suspects that quality and quantity have been confused in this case, since it is probable that needed changes are easier to make now than in a time of manpower shortages. Because of teacher surpluses, we can now make significant improvements in the undergraduate preparation of prospective teachers. NSF has supported developmental efforts in undergraduate teacher education for several years. USOE will announce its UPEP program (Undergraduate Preparation of Educational Personnel) in the fall or winter of 1972.

While developmental funding is important if our educational systems are to be improved, maintaining our institutions requires full funding of all costs associated with federally supported projects. Sensitive to this need, research grant programs typically

provide direct costs plus full, audited indirect cost reimbursement if the college or university agrees to share in the total cost of the project to the extent of at least three per cent. Indirect cost reimbursement is essential since there are real costs incurred in providing general campus services (e.g., administrative assistance from a variety of institutional offices, access to the library, and use of the physical plant).

Most non-research programs have until recently not paid the full cost of projects. Thus, while an NIH research grant will carry full indirect cost reimbursement (forty to eighty per cent of total salaries and wages), the typical Office of Education training grant will carry with it no more than eight per cent of total cost as partial indirect cost reimbursement.

NSF and NIH provide semi-categorical institutional grants that carry discretionary funds for the improvement of each institution's research and educational capabilities in areas of particular concern to the grantor (e.g., biomedical research and research training for NIH). The size of individual grants is determined by a graduated formula using as a base the total of all research grants accepted by the institution during a twelve-month period. Colleges and universities use funding of this sort for implementation of needed improvements in staffing, program, and facilities. Support for a small internal grant program for research initiation is fairly common while some schools provide support for faculty and curricular development. In newer institutions (e.g., Oakland), NSF institutional grant funds may be used to provide backruns of scholarly journals.

Non-categorical institutional support from federal sources on a formula basis, as authorized in the Higher Education Amendments of 1972, may eventually appear. However, there is a world of difference between authorization and appropriation, as all Congress watchers know. Further, it may well be that semi-categorical support (funding to be used with discretion in defined areas) will turn out to be more useful to institutions than non-categorical monies which are not protected against raids by academic or legislative marauders.

Finally, under this heading is included grant and loan programs designed to assist in the improvement and expansion of the physical plant. These efforts, now sharply reduced, are largely tied to increasing the numbers of students to be served rather than to improving the quality of programs offered.

7. Student aid. I am deliberately going to avoid any detailed description of student aid programs. There are two reasons. First, student aid has been extensively and expertly discussed in Ashworth's recent book entitled *Scholars and Statesmen.*[2] Secondly, student aid and its relationship to institutional support and the development of institutional programs will be touched on in subsequent chapters. While there is some tendency on the part of federal agencies and the general public to confuse student aid with institutional aid, I trust that we can, in subsequent discussions, separate the benefits of increasing access to post-secondary education from the benefits of strengthening educational institutions.

* * * * * *

In succeeding chapters, I will show that as relationships between the federal government and higher education mature, we may expect to see a shift away from the narrow concerns of early grant programs. Perhaps the agencies will begin to ask questions such as: How can we achieve particular national goals (e.g., increasing access to higher education or upgrading experienced teachers) while at the same time strengthening institutions contributing to the general welfare?

Most agency officials and more and more institutions are sensitive to the secondary and tertiary effects of federal grants; all are becoming more fully aware of the total cost of various project approaches. It is clear that the best interests of the federal government require that we examine federal program policies and practices in the light of institutional needs and aspirations.

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[2] Kenneth H. Ashworth, University of Texas, *Scholars and Statesmen,* Jossey-Bass, Inc., San Francisco, 1972.

The reciprocal nature of the relationship may be illustrated by the effort begun by the Division of Grants Management Policy, of the Department of HEW, to help colleges and universities to improve their own management capabilities.[3] The approach, which is going to take some time to complete, will compare local management practices to some very good models. When good management practices are being used, the federal government will relax its grant monitoring efforts considerably. Combining this effort with improvements in the design, management, and funding of agency programs would produce a substantial improvement in the relationships between government and education.

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[3] Details are contained in "A Program for Improving the Quality of Grantee Management: Financial Independent Organizations," Vol. I; Division of Grants Administration Policy, Office of Assistant Secretary, Comptroller, HEW, June, 1970.

THE PROJECT APPROACH AND PROPOSAL REVIEW

Those who have dealt extensively with the federal government may wish to skim this chapter rather quickly. In it, we attempt to describe some of the workings of the project system, particularly the mechanics of proposal review and the awarding of grants. I'll draw heavily on my experience at NSF, where during the mid-sixties the Undergraduate Research Participation staff and the Instructional Scientific Equipment program unit, both under my direction, were reviewing in excess of 3,000 proposals each year. At the present time, at Oakland University, I am reviewing something over a hundred proposals per year prior to submitting them to public agencies and private foundations.

Each program unit in the federal government has its own style, but it is possible to generalize. Our hope is that by examining processes of proposal review we can be of assistance to faculty members, particularly those in the humanities who are now approaching the National Endowment for the Humanities, and to those federal officials who occasionally worry about the particular methods they are using for soliciting proposals and reviewing them.

First of all, let's look at the proposal. Within the scientific research community, the problems which are of greatest concern at a particular moment are well known. That person, typically on a university faculty, who develops an approach to a significant research question begins almost automatically to write a request for funding. The proposer must convince his colleagues in the guild that he is aware of what is currently known in a particular sector and that he has developed a means, either experimental or theoretical, which offers the possibility of gaining new insights. The experienced investigator can make his case in six to ten pages, since there are well-defined canons for doing research and judging its significance.

The reader can anticipate me at this point by thinking about the ways in which our educational problems would be simplified if we could sort out good work from poor work more easily. While the problems of physical chemistry are pretty clearly defined, it is

more important to note that the results of particular researches can be evaluated by any number of persons who are skilled in the field. Further, these evaluations can be fitted into a paradigm for the discipline which is self-correcting over time. Research proposals in non-quantitative fields and requests for instructional development funding in all areas are much more difficult to judge.

Scholars who rely on NSF for funding know that the NSF research divisions follow disciplinary lines in their organizational pattern, with the new interdisciplinary RANN program (Research Applicable to National Needs) being the chief exception. Thus, one finds a division of physical and mathematical sciences and a division of biological and medical sciences, with sub-groups concerned with physics, chemistry, mathematics, biology, and so forth. The tendency, then, is for program units to form in parallel with established disciplines, although Congress is increasing the pressure on NSF to become more problem-oriented.

NIH, on the other hand, has been organized from the beginning on a problem basis, or on a functional basis related to application. Thus, separate institutes are devoted to studies of cancer, heart disease and stroke, the eye, neurological diseases, mental health and human development, and so on, capped by a kind of special-projects group devoted to "general medical sciences." The informed proposer approaching the National Institutes of Health links his research plans to a particular biomedical concern. The same proposed research presented to NSF tends to be worded somewhat differently, with the emphasis being on its contribution to the basic knowledge needed by a particular guild, to build a more complete structure of knowledge within a particular discipline.

Problem Orientation Useful

The NIH problem orientation is useful in stimulating interdisciplinary research and poses fewer barriers to the formation of multidisciplinary working groups. Also, part of the success of NIH in gaining Congressional approval of its work is due to its grouping of research efforts around problems which Congress can appreciate and understand rather than around the much

less visible and much less easily explained disciplinary matrix. NSF, then, seems to have chosen a research structure which is familiar to the guilds rather than one which reflects the public interest. Of course, NIH has its guilds, but they consist of people drawn from a variety of disciplines who are concentrating in a particular problem area. The newly established National Institute of Education would be well advised to examine the NIH organizational pattern carefully.

Group training and developmental proposals are intrinsically more difficult to prepare than research applications, since the former require not only inputs from much larger numbers of people, but almost automatically begin to involve more directly and more intimately the procedures for governance and management within the institution. Thus, a summer institute for high school language teachers may very well involve design of a new set of courses and approval of these courses by departments, committees on instruction, deans, and university senates. The design and approval of, say, a master of arts in teaching program may require not only internal approval but the blessing of a statewide coordinating board for higher education and preliminary inspection by an accrediting agency.

A developmental proposal cannot be initiated without extensive discussion within a department or a group of departments as to directions of change and the particular strategies of change which are to be invoked. Getting a proposal put together for the College Science Improvement Program at NSF may very well involve several years of work, as the proposal is refined by discussions within and between departments, within a particular college, and in concerned administrative offices. While the developmental programs in the federal government have served, in my experience both in and out of government, to stimulate realistic work on institutional change and the tactics of change, there seems to be generally within the agencies, OMB, and Congress insufficient awareness of just how effective programs of this sort are in improving the quality of our educational enterprises.

Let us now assume that a proposal has been written and approved by all parties concerned within the university or college,

and that we have tied 20 copies or so neatly in a package and mailed it to Washington. What happens next?

The proposal is received at the agency by some sort of central distribution unit which records in a log the date of receipt and an internal control number. The proposal is then assigned to a particular program unit for preliminary examination. At this point, substantive review of the content of the proposal begins, with a program officer checking the proposal to make sure that it conforms to the guidelines, and then placing the request before an appropriate review panel. The review panel, or study section, or whatever it may be called in a particular agency, is normally composed of informed and experienced people drawn from college and university faculties. Representatives from the schools, from the community colleges, and from graduate or undergraduate student bodies may be included where appropriate.

The key to the review process is that the panelists are not employees of the federal government, but are drawn in on a short term basis, with generally little or no compensation beyond costs of travel, to engage in intensive discussion and rating of a group of similar proposals.

Mail Review System

Here we begin to see differences in patterns of operation. The research program director may very well choose to invoke a mail review system rather than to convene a panel. He selects *for each proposal* a small number, anywhere from four to eight, of persons in the particular specialty or sub-specialty in which the principal investigator plans to work. The process is very much like that used by an editor of a scientific journal and poses some of the same problems. For example, if the reviewers are in disagreement the program officer may have a difficult time drawing out of the separate review statements some sort of consensus which can support a decision to fund or a decision to issue a "nothing but praise" letter. This system does place great responsibility on the program officer and, as a consequence, requires that he be particularly well informed and up-to-date in all aspects of his field.

Alternately, a program director or an executive secretary may convene a panel of experts to review a group of proposals which have similar goals. Within NIH, these review panels, called "study sections," meet at regularly stated intervals, with each member of the study section given prime responsibility for several of the proposals within the group, so that he is prepared to act as discussion leader when the final judgment is being reached on the scientific merit of a particular request. The problem orientation within NIH means that many study sections are, in fact, multi-disciplinary and interdisciplinary in make-up. Note that this process suggests that the guilds formed around NIH are necessarily different from those which cluster around NSF.

Evaluation of group training projects and developmental approaches, particularly within National Science Foundation, is accomplished by a dual panel system. For example, a group of instructional equipment requests from physics departments are assigned simultaneously to two panels, meeting independently. In this way, the results of the work of one panel can be compared with those of the second panel. In the relatively limited number of cases (about one in thirty) when a proposal is judged to be "highly meritorious" by one panel and "of doubtful merit" by the other, the separate panels (generally three or four men per panel) can be combined into a single review board until the reasons for the disparity are made clear.

On occasion, agencies have done extensive staff review of proposals before convening a panel or an advisory group to comment on and criticize internal assessments. Normally this procedure doesn't work too well. Most program officials, I believe, have more confidence in a system using competent external reviewers to give their reactions to proposals without staff intervention. Normally, federal officers favor the study section or dual panel approach, although mail review is often the only option available when dealing with small numbers of highly specialized proposals.

One of the concerns expressed in some of the larger training grant and developmental programs, before the present crunch, was the increasing amount of time required on the part of an

increasing number of reviewers. During the salad days of the NSF Instructional Scientific Equipment program (1962-1969), that one program unit used more than 500 reviewers each year, with each panelist giving two days of panel service (plus perhaps half a day of travel time on the average) for a total annual usage of unpaid experts well in excess of five man-years. One cannot extend this sort of approach too far without having to close down all of the colleges and universities for a week each year in order to review project proposals, but the advantages in national dissemination of information on new developments as reflected in the proposals should not be ignored.

One of the chief strains on this sort of review system is the pattern, entirely too common in the federal preserve, of funding projects on a one-year basis. Funding of developmental and training projects for periods of three to five years, as NIH does with research projects, could effect substantial savings in money, time, and energy within the agencies, while the conservation of the time of faculty and staff in the colleges and universities would be significant and much appreciated.

Site Visit Teams

When dealing with large developmental projects or with multi-year renewal of previously funded group training efforts, one can send a small review panel as a site-visit team to the campus seeking support. In this way, following the tested procedures of some of the accrediting agencies, a team can gain a good deal of information about the relationship between what is written in the proposal and what is actually going on at the institution or institutions seeking support.

The costs of a three-man visiting team spending two or three days on-site every three to five years is a good bit less than the cost of assembling larger review panels each year. The costs associated with reviewing, by whatever system, have obviously gone up in the last five or six years; but some relatively simple calculations will show that site visits are a reasonable option when dealing with multi-year requests, particularly since a good visiting team can collect much more information than the pro-

posal alone can offer. When one is concerned with inter-institutional efforts to improve, say, clinical training for preservice teachers, there probably is no other way to ensure that sound judgments can be made.

A point that should be stressed is the differences from program to program, in the kinds of instructions which are given to reviewers before the review process starts. Within research groups, the instructions tend to be minimal since criteria are well established and generally understood by all participants. Within group training programs, the stress tends to be largely on the impact of the training opportunity on the participants even though, as I have indicated, both institutions and agencies should be more concerned about the local developmental effects of group training efforts.

A whole new element intrudes in the evaluation of developmental requests. Here one is looking at rates of improvement and indications of the direction in which changes are taking an institution. Note that rates of change and directions of change are relative terms suggesting degrees of improvement rather than absolute measures of quality. Thus, while research grant programs measure faculties and their work against the highest intellectual standards of the guilds, developmental programs tend to favor those institutions which are very much aware of their own shortcomings and which present, in convincing fashion, plans to take relatively large steps forward. To put it another way, developmental programs offer great opportunities not only to improve diversity in the American educational systems, but to strengthen those institutions which have clearly worked out plans for improvement which are consistent with the aspirations and capabilities of that particular institution. In the Instructional Scientific Equipment Program, which used the relative developmental criteria indicated above, the reviewers and staff were more likely to endorse a sound proposal from a relatively unknown college than to accept a mediocre request from a large university. As an example, a top ranked proposal in the 1962 competition came from the biology department of a small southern college, which admitted frankly that it was currently teaching 1910 biology but

that it had plans, outlined in detail in the proposal, for moving to 1950 biology. The department said, "We realize that we have to get further along than 1950, but we can make a 40-year jump within the next two years with your help. Once we have done that, we will be back to see if we can make the step from 1950 to 1965." Obviously, the expected return on federal investment in that instance was a good deal better than investing the same number of dollars in a functioning modern department which could not see any way to improve its present offerings other than to extend what it was already doing.

Top 20 Per Cent Picked

At the end of the panel review, the program staff has a grade priority ranking for each proposal as well as detailed comments on it. Picking out the top 20 per cent of the proposals and the bottom 30 per cent is now quite easy. If the program staff has sufficient funding so that more than 20 per cent of the proposals can be supported—which used to be the case but isn't the common situation any more—some additional steps are needed. The large middle group of proposals obviously encompasses those judged by the reviewers to be meritorious but not particularly exciting. Included are good projects which would be useful to carry out and which would, undoubtedly, improve the geographical and disciplinary scope of the program if they were funded.

The program staff normally begins by looking at the detailed budget requests of the top proposals. While preliminary judgments are being made on the costs of funding this group—and note that these costs are not necessarily those requested by the proposers, but those in the judgment of the program staff considered sufficient for carrying out the projects—any information available from site visits of on-going projects by consultants and by the staff of the agency is injected into the processing. In some instances there will be considerable discrepancy between the panel judgment of a request for renewal and a visitor's assessment of the effectiveness of the project. If the visitor has done a good job and has high credibility within

the agency, his judgment may be crucial. In an interesting way, a high panel rating plus a poor grade by a visitor is less likely to lead to a denial than the reverse situation. When the panel recommends denial and the visitor's report is good, a letter of denial tends to be issued, with the rationale being that, if the project director has done a poor job of presenting the results of his work, he may not even be aware of them.

If funding for more than the top 20 per cent is available, the staff will sort through the remaining proposals considered to be fundable, in order to achieve a balance by discipline, by institutional types, and by region of the country. Thus, if the top 20 per cent of proposals contains more than 20 per cent of the biology proposals submitted to the program, it is unlikely that additional biology projects will be picked up. If psychology is underrepresented in the top 20 per cent, efforts will be made to pick up good projects in psychology from the meritorious group. This sort of process normally doesn't involve too many additional grants, so that the staff influence on the final list of winners tends to be relatively minor when compared with that of the review panels.

The staff's largest input into the review process is the selection of reviewers. Don't underestimate this power, because a staff professional can influence greatly the final grant list by selecting large numbers of reviewers who share his own particular views. Those of us who have worked with and on review panels have seen reviewers who are sharply biased against small colleges or against large universities, and those who feel that nothing good can ever come out of a particular state, a particular institution, or a particular sub-discipline. This sort of thing doesn't happen too often, and it's a great tribute to the academic profession that the vast majority of those called to review proposals for federal agencies are conscientious and hard working and honest. The blind bias of one or more reviewers tends to be fairly easy to identify and to correct, especially in the dual-panel system.

Once the review process is completed and the selection of the crop of grantees finished, the next step is negotiation with those

selected, to make sure that the financial arrangements for funding are adequate. I cannot stress too much the importance of carrying out this negotiation well before grants are issued. The project carefully designed to fit a particular budget may simply be impossible to run at much lower costs. The institution involved and the project directors of a particular proposal must have an opportunity to react prior to the granting of funds in order to insure that the project can be carried out at a reduced level, if that is required. From an institutional standpoint, negotiating budgets with an agency after grants have been awarded is something like trying to compete in a race with one foot planted in a bucket of concrete. It's clearly unfair to the institution and to the individual proposers to offer support at a reduced level in an official and public manner before discussions and agreements concerning the budget are completed.

At this stage, the program unit normally prepares a carefully documented description of proposals received, the review process used, and its results, and the staff actions taken after the reviews are in, along with its recommendations for grants and declinations. This document is the basis for presentation to the next echelon within the agency, with this presentation having in some instances the elements of defense of a doctoral dissertation. The purpose of this inquisition is to assure the heads of divisions or assistant directors of agencies that the program unit has in fact done its job in a professional way and that it is prepared to defend the decisions it has proposed. This review plus the external review process serve to protect the program staff from the heavy hand of political intervention if the staff wants to be protected. Once this process is complete, the grant documents are prepared and reviewed by the financial and legal offices within the agency to assure that all of the technical and legal requirements of the law and the agency have been satisfied.

Congress Informed First

When grant and declination letters are approved for release, Congress is informed. Custom and tradition require that members of Congress know at least 24 hours before issuance of grant

awards which of their constituents are to be rewarded and which are to be dismayed. Some members of Congress take this occasion to call or wire colleges and universities, informing them before the agency does that an award has been made.

The awards go out, along with some sort of press release which alerts the news media that the agency has obligated some of its funds in a particular pattern. The program staff then, rather than getting a well deserved rest, must begin to respond to phone calls and letters from those who have been denied support. This phase of the operation is of particular importance, because the detailed reasons for denial are useful, particularly to an institution submitting a developmental proposal. If it is clear to an informed panel that the direction and style of change suggested in a proposal seem not to be appropriate, the analysis made by the panel should be made available to the proposer.

In the early days of the Undergraduate Research Participation Program, we kept track of some departments which had been denied support. The sample was selected largely on a self-identification basis, consisting of those proposers who called or wrote us asking for reasons for denial. In each case, we conferred by telephone with the proposer and while protecting the anonymity of the panel we did relay a rather complete picture of panel comments. The following year, we discovered that 60 per cent of those who had taken the trouble to get advice on the reactions of reviewers and who had submitted revised proposals were successful. Let me put that figure in context. Normally, if a program is supporting 40 per cent of the proposals submitted to it (the figure is closer to 20 per cent these days), it probably means that 90 per cent of those applying for renewal are likely to get support, with perhaps 15 to 20 per cent of those who are applying for the first time gaining support. The 60 per cent figure for those who had applied once, been denied, and then re-applied after learning the reasons for denial suggests that there is a learning effect which can be accelerated by better flow of information from the reviewing panel to the professional staff to the proposers. Note that, in the review procedure, the reviewers are acting as free consultants to the proposer, so that the

unsuccessful proposer can get an informed critique of his proposal. Such a review can tell him, "The design of your project or its intellectual or educational rationale is faulty, because . . . " This sort of impartial advice may or may not be heeded, but it can be extremely valuable, particularly to individuals and institutions who have been working in relative isolation.

The flow of criticisms from panel to proposer need not necessarily lead to greater uniformity in projects submitted. Hopefully it can serve to improve the design of experiments which are tending to flare out in different directions. It can, in some cases, point out that a particular experimental pattern proposed is in effect in another institution and is not working well. The proposer might then be well advised to consider modifying his approach to avoid the pitfalls others have uncovered. This sort of feedback, which is common and useful in the research field and which can prevent for example an investigator in organic chemistry from repeating an unsuccessful experiment already reported in the journals, should be extended more widely to assist college and university faculties in learning from the educational experience of others.

Review Panel Is 'School'

While at NSF, I was asked occasionally if we would establish a means to assist faculty in the preparation of proposals. My response was, "We have a school, and we call it the review panel." (Obviously admission to this "school" is severely limited and is controlled by agency officials.) It was not uncommon to have a new member on the review panels thank us at the end of a session because of the insights he was able to gain into the thinking of a number of similar departments around the country. The experience of sitting with a small group of colleagues for two days and engaging in intensive discussion of the merits and demerits of thirty to forty proposals from departments similar to your own can be quite revealing. This aspect of the federal review mechanisms hasn't been emphasized very much. It is important.

The program staff's job isn't over yet. Once the flood of inquiries from those who have been denied support subsides, the

staff begins to get a series of questions and comments from those who have gained support. The questions now become largely operational: "May I make the following changes in my use of granted funds?" "Is it possible for me to increase the number of participants?" "The project director has resigned. May we replace him with Professor Jones?" The questions are endless, the variations most interesting, and the program staff gets deeply involved in them. At the same time, it must begin to prepare for the next round of proposals by revising justifications for the budget requests for the program, and collecting measures of program effectiveness.

The measures of program effectiveness at hand tend to be pretty superficial, particularly those which attempt to use cost figures because they are available. Appropriate measures of intellectual and educational impact are all too rare. It's fairly easy, in a group training effort, for example, to collect figures on the number of teachers affected, the total cost, the cost per teacher, and some differential costs by discipline. But one must be very cautious in attributing meaning to these numbers unless one can also fold in non-cost factors.

One of Mort Sahl's quips, "Order is more important than justice," served to remind me that it is all too easy to grasp at numbers to gain confidence that we were doing something, even if in fact the measures were clearly inadequate. One of the antidotes for this tendency to be complacent about program effectiveness is the periodic convening of a first rate advisory committee which has had the experience of looking at some of the funded projects in operation without having the emotional ties to the program that the staff has. Advisory committees can be quite useful in uncovering facets of program operation which the staff is too close to see. Similarly, a good advisory group can suggest directions for program development.

Finally, if there is time and money, the staff will disperse to visit individual projects in operation. We discovered rather quickly that in developmental programs, such as the Instructional Scientific Equipment Program, the funded proposals contain their own

bases for evaluation by a staff visitor or a consultant. Specifically, the good proposal told us directly what the institution hoped to achieve during the grant period. With the measures of success in the proposal, a site visitor could determine in a day and a half whether the project was in fact going as planned, or not.

Those who have served as project directors, as review panelists, and as agency officials recognize that the project system as described above tends to identify and solidify a guild for each funded federal program. This informal association doesn't amount to much unless the program continues for some years. Perhaps more importantly the transient guild may concern itself more with funding for a particular program than with the ways in which the agency can use its funds more effectively to achieve important, long-term educational goals.

THE FEDERAL AGENCIES

Each agency has not only its sets of constituencies but also its own particular relationship with Congress and with the President's watchdogs in the Office of Management and Budget. I find myself arranging the agencies most important to higher education on a scale which reflects the willingness of Congress to give each one authority to act as well as the funding needed to do the tasks defined.

At the top of the list is the National Institutes of Health.[1] The various components of NIH have been extremely well treated by Congress and the President's budget-makers. Not only have NIH budgets increased magnificently over the years, but NIH has had a good deal of freedom to determine its own priorities and to establish its own modes of operation. While critics of NIH—and there are a few—have produced evidence from time to time that NIH has not been as vigilant as it might have been in monitoring activities carried out under certain grants, one must give NIH top marks for management of a complex enterprise.

Relationships between NIH and the university community have been excellent. Note, however, that NIH does not deal with most of the colleges or with the community colleges or with the schools. NIH staff members are sensitive to the customs and modes of operation of universities because, as indicated before, nearly all are in close touch with their individual constituencies. The backbone of the NIH guilds is the established investigator who gets support on a multi-year basis, so that he need enter the maelstrom of competitive renewal only every three to five years. The contrast between multi-year funding and funding one year at a time can only be appreciated by someone who has tried to initiate a complex project with only one year of funding in hand, while writing a proposal for second-year support. The pains of the lower circles of Hell are preferable.

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[1] The National Institute of Mental Health is included in my definition of NIH, even though it is now separated organizationally from the other Institutes.

The success of NIH with Congress and with the Executive Office of the President, while primarily linked to strong leadership and a powerful medical research lobby, can be traced to the important but limited mission of NIH, which concerns itself with the basic knowledge needed for understanding and controlling of the afflictions of mankind. Since most Congressmen are older citizens, Congress continues to support with enthusiasm research and research training in the biomedical sciences. Nearly every year, NIH seems to face the delightful problem of spending more dollars than it had requested from Congress.

The effect of this generosity on some parts of the university is quite obvious. Faculty members engaged in NIH-supported biomedical research and research training efforts are kings of University Hill: they have the latest scientific equipment, plenty of apprentices fully supported, squads of technicians and, in short, all the money they need for their research. All sleep well most nights, and some are humble.

While NIH does limit its *educational* mission largely to research training at the graduate and advanced professional level, support for educational purposes other than those directly concerned with research has been afforded in some cases. But NIH has not sought the role of patron of educational innovation, even in the medical and dental schools. The developmental work that has been done—in the allied health professions, for example—has been handled by other units of the Public Health Service.

The middle of my list is occupied by the agencies such as the National Science Foundation, the Atomic Energy Commission, and various elements of the Department of Defense such as the Office of Naval Research, the Air Force Office of Scientific Research, and the Army Office of Research. Each has friends in Congress and in the Office of Management and Budget and each has had fairly steady growth.

NSF Has Great Freedom

The National Science Foundation is unique in one sense: its brief enabling legislation, the National Science Act of 1950, gives

it great freedom to decide what it will do and how it will do it. In recent years a subcommittee of the House Committee on Science and Astronautics has stepped in, initially under the leadership of Representative Emilio Q. Daddario (Connecticut, Democrat) to act as a substantive review committee; Senator Edward M. Kennedy (Massachusetts, Democrat) heads a comparable group in the Senate. This relationship with Congress, while it may limit NSF's flexibility in some ways, does give the agency much needed access to Congressional thinking.

While National Science Foundation can, with a nod from two Congressional committees, proceed to make rather substantial changes in its policies and practices, the Office of Education, by contrast, must secure introduction and passage of new legislation before it can make changes. Congressional involvement in setting broad priorities for an agency is useful if it is carefully done but, particularly in the case of USOE, Congress has insisted on control of the details of implementation to the extent that the agency has been hamstrung. The Office of Education must be rated as the least favored of all agencies dealing with educational matters.[2]

The National Endowment for the Arts and the National Endowment for the Humanities, both founded in 1965, are too young for any reasonable assessment of their places in the heirarchy. It does appear that the Arts Endowment staff and its constituencies are not likely to develop the strong ties to higher education other federal agencies have, primarily because advancement in the performing arts is based on demonstrated talent rather than on credits and degrees. While apprentice training in the arts may become more structured and formal, one would rather see the colleges and universities adopt the sort of open performance-based approach which the arts—and athletics—have used for centuries.

The National Endownment for the Humanities seems to be developing the sort of staffing base and constituencies that NSF

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[2] Congresswoman Edith Green's article in the Summer, 1972, issue of *The Public Interest* illustrates the plight of USOE.

has—with one major difference. Although the emergence of "big science" with its complex instrumentation and teams of researchers reduced the attention given by NSF to the "little science" which can be done by individuals in the smaller universities and the colleges, NEH continues to be sensitive to the needs of scholars in the humanities wherever they happen to be. NEH can avoid the charge leveled at NSF that it is chiefly concerned with the needs of the universities. Congressman Daddario suggested at one time—only partly in jest—that NSF be renamed the National University Foundation. Efforts are made from time to time to broaden the NSF base, but that agency will not be on solid ground until it becomes useful to more of the educational world.

Both the Arts and Humanities Endowments have had excellent treatment to date from the President and the Congress. Both, however, are extremely small and are likely to be treated rather casually until their individual appropriation levels reach $400 million (roughly the amount spent by the Department of Defense in one working day) per year.

Congressmen 'Experts' on Education

While Congressional interest in research and research training varies from enthusiastic to neutral, its concern for educational problems leads one to believe that each member of Congress sees himself as an expert on matters of educational policy and practice. Any agency becomes more vulnerable as soon as it attempts to deal with educational problems. The pre-college level is especially hazardous, since whatever affects the schools may become a political question. The public elementary and secondary schools are, in fact, big business, involving the vast majority of our children, employing a large segment of the total work force, and impinging on that large part of the total voting population called parents.

It should be no surprise that the U.S. Office of Education is a favorite Congressional target. In Congressional hands, even the most carefully prepared education bill quickly becomes plastered with amendments and scarred by deletions until each con-

stituency has its own title containing some promise of support. A politically viable package almost always produces an administrative nightmare. The latest case at hand is the Higher Education Amendments of 1972. This bill was delayed for a long time while an uncertain compromise on essentially unrelated amendments on school busing was reached.

Perhaps this sort of behavior is incurable and can only be tolerated. It is possible, though, that agreement will be reached eventually that each agency needs more freedom to set its own style. NSF, NIH, and the Arts and Humanities Endowments appear to have this authority and, in consequence, their patterns of activities are sensible. The newly authorized National Institute of Education may serve, if properly implemented, to separate major policy concerns—which should be subject to intensive debate—from the procedural patterns of the agency which should come under Congressional scrutiny only when there is reason to believe that an important task is being mishandled or ignored.

The interests of education—and higher education in particular—would be better served if we could present our views to Congress with greater force and with greater unanimity. As Daniel Moynihan pointed out in a talk to the New England Board of Higher Education in December, 1971,[3] higher education has the worst lobby in Washington. The examples of ineptness and inaction he describes are caricatures of the ways in which effective lobbies act.

It is possible that greater coordination, leading perhaps to greater strength, will grow as the educational associations and the professional societies, now largely housed in or near One Dupont Circle, begin to pull together. The process surely can be accelerated by examining the opportunities missed in recent years.

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[3] *Conference Proceedings: Public Policy for the Financing of Higher Education,* New England Board of Higher Education, Boston, 1971.

THE EFFECTS OF FEDERAL PROGRAMS

This chapter is devoted to an examination of secondary and tertiary effects of selected categories of federal support for educational purposes. While, in many cases, the primary goals of federal efforts have been reached, we must consider the prices that have been paid.

Let us begin with the most venerable group, grants for research and research training. The reduction in recent years of categorical support for graduate students has revealed the open secret that the research grant, originally intended to facilitate the research of carefully-selected and productive academics (and immensely successful in this effort), has been extended over the years to include support for portions of the nation's graduate programs. Both program officers and their constituencies have pressed for increases in the scope for individual grants so that more and more graduate students could be incorporated into research teams. The effort has been so successful that cutting away even a handful of research grants in a typical university department can wipe out a graduate degree program and most of the graduate students in it.

Graduate programs of quality have earned the right to stable sources of continuing support. Instead, the health of many graduate programs is dependent on continuing external research grant funds. Isn't it time that we recogize that more direct and more stable support for graduate education and a more realistic allocation of university resources is needed if we are to maintain vigor and balance?

Not only have we produced too many Ph. D.'s in areas such as high-energy physics, but we have badly underestimated national needs in, for example, the environmental sciences. Because relatively few research programs in the fifties and sixties were funding environmental studies, only small numbers of people fully qualified in areas such as limnology and hydrology were trained. Now that environmental sciences are fashionable, we undoubtedly will have more graduate students in these specialties, but what assurance do we have that we are not overpro-

ducing or underproducing for th next generation? Admittedly, the projection of manpower requirements is a difficult art, but we ought to be able to do better than we have. Even the mystical processes of governance and allocation of resources within universities as currently practiced would have given us a better and more diverse set of graduate specialties than the system we have evolved. With an excessive amount of the control of institutional balance in the hands of the research guilds, one can only hope the sum of all the judgments made in Washington will not hurt the individual institution too much.

It is quite possible that the nation's graduate schools have, by and large, not evolved better systems of governance and management because the real advocacy game was and is being played in Washington and not on the campus. A seat on a federal agency study section or divisional committee is worth five votes back home, and one gets five more votes if one holds local control of external research or research training support. Any sort of thoughtful agreement on the use of local resources becomes impossible when all players are waiting to see how Washington distributes the votes.

Perhaps we should be thankful that the vast majority of research awards have been—and continue to be—concentrated in a relatively small number of universities. NSF officials used to talk about the "loop of 21," since more than half of all federal research grants find their way into the coffers of those 20 to 30 institutions who produce the bulk of the scientific research output of the country, and the bulk of the Ph.D.'s.[1]

'Loop of 21' Depend on Research Grants

There is one effective higher education lobby in Washington which goes into action when research grants are threatened in any way. The "loop of 21," well represented in Washington, responds to the rallying cry, "Without research grants, graduate

[1] NSF publication: NSF 72-301, *Federal Funds for Academic Science, FY 1970*, gives details on funding patterns.

education in the United States will collapse." It is more accurate to say that, if all research grants were terminated tomorrow, 20 to 30 universities would indeed be grievously wounded, while most institutions would not even know they had been shot at.

As Drs. Dressel and Come have documented,[2] research grants are not common in the colleges and the smaller universities. Surely, the stimulation of scholarly effort on the part of individual faculty members and students in these institutions deserves more attention than it is getting.

In contrast, nearly all institutions of higher education have federally-funded student aid programs, which stress assistance to disadvantaged undergraduates. Removing barriers to admission to higher eucation is long overdue, but one cannot assume that aid to students is aid to institutions. In fact, institutions need far more resources than they now have if they are to serve more students from wider diversities of background.

Thus, federal funding can benefit society while weakening colleges and universities. Federal grants can cripple higher education, and the first casualties will be private liberal arts colleges. This important element in higher education, now in a fiscal crisis, will disappear unless federal money can be made to work for, rather than against, institutions of higher learning.

Dr. Joel Hildebrand of Berkeley said that you couldn't make him choose between teaching students and teaching chemistry. Because he did not confuse the dative and accusative cases, he taught chemistry to students. But he needed—as we all do—an institutional base. In short, we teach chemistry (or English, or history) to students in a college or university. If we allow the disciplines, the student body, or the institution to deteriorate, we cannot teach effectively for very long.

The federal agencies, the legislatures, both state and federal,

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[2] Paul L. Dressel and Donald R. Come, *Impact of Federal Support of Science on the Publicly Supported Universities and Four-Year Colleges in Michigan*, National Science Foundation, 1969.

and our own faculties have paid too little attention to the needs of institutions. Many schools are now deferring needed campus maintenance, needed curricular improvement, needed student aid and needed programs for the development and rejuvenation of faculty and staff. In the short run, we can get along without building new buildings, without repairing roadways and parking lots, without replacing old heating plants, and without giving old deans chances to renew their faculties. Sooner or later, institutions begin to decay. While there are schools in the country whose collapse might go largely unnoticed, each does have its own clientele largely dependent on it for access to higher education.

The weapon to choose for killing an institution is the group training grant; it may work better than neglect. Many of the group training programs partially funded by the federal government require that all or nearly all of the courses (including laboratory session, internships, etc.) be specially designed and open only to selected students. In return, the federal agency usually consents to fund a portion of the cost of the project for one year. While the agency may offer some hope that the project will be continued for three to five years, the project director is rarely able to get the sort of full funding and firm multi-year commitment that NIH, for example, provides. The institution ordinarily is obliged to pay at least 20 to 40 per cent of the total cost of offering courses so specialized that the carry-over into ongoing degree programs is slight. Take a college in shaky financial condition, add two or three training grants of this sort, and you cook up a mess in a hurry.

Partial Funding Harmful

Many colleges and universities, unfortunately, have not only been unable to resist short-term, partial funding for training programs for special groups but have even offered to accept funding at less than authorized levels. There must be a number of reasons which fall in the realm of irrational. But the needs of the elementary and secondary schools are real and massive; university and college faculties are intimately aware of the effects of the continuing deficiencies of the schools; and only the colleges and

universities can now provide the sort of training required. Some alternative modes for group training may be needed but, as of now, they do not exist.

The federal agencies, aware of the tender sensibilities and economic naivete of higher education and responding to pressure from pre-college lobbying groups, have chosen to support many group training projects at much less than full cost, without apparently recognizing that this sort of bargain basement game hurts all who play it.

Faculties must be specifically faulted, since most are unaware of the full costs of operating an educational enterprise. The typical faculty member's sense of the costs of instruction is limited; all must be going well if his salary is paid and his department has some funding for supplies, services, and equipment. He fails to recognize that, for every salary dollar, an additional ten to twenty cents is required as an institutional cost for fringe benefits and an additional forty to eighty cents for supporting services. He ignores capital outlay requirements, student aid costs, debt service, and all of the other real obligations of a complex organization. The joker is that those administrators who believe secrecy to be the key to good management have seen to it that the faculty does not know the economic facts of institutional life.

The federal agencies that fund training programs—NIH is an important exception, with NSF and NEH becoming so—pay most of the direct costs of a project, but only a portion of the indirect costs, apparently viewing indirect costs as not real, or as profit for the college and university. Oddly enough, some state budget offices and state legislatures now share this view, so that it may be necessary to give up the endless argument. Perhaps discarding reimbursement of audited indirect costs in favor of increased funding for semi-categorical grants—such as the NSF Institutional Grants—is a better political solution.

The staffs of the small number of institutional development grant programs are well aware that the capabilities of the colleges and universities must be enchanced if these institutions are to

continue to be responsive to national needs. Developmental grants, made after competitive review of proposals, provide support during a transitional period while a college or university is making locally-planned improvements. Funding is provided on a two to five year base, usually with no renewal option, although extension without additional funding is fairly common.

This approach has great possibilities. For one thing, it allows the agency to make an initial series of non-renewable awards and then, in each subsequent round, to fund a different set of projects. Thus, good geographical and disciplinary distribution of support is more easily attained than in traditional programs. Simply not having to deal with renewals can be a great boon to the agency staff and its reviewers. Carefully used, this mechanism can foster greater diversity among institutions as quality is increased.

Spending 'Play Money'

The institutions, given a chance to plot their own futures, treat federal dollars as if they were their own. The care with which developmental projects are handled is most heartening, especially to those of us who have seen federal dollars in much more restricted training and research projects treated as if they were not hard currency. In an odd way, the more restrictions that are placed on a project grant and the shorter its duration, the more likely the principal investigator or project director and his host college or university are to act as if they were spending play money. Individuals and institutions rebel against what seem to be arbitrary restrictions, but this tendency can be lessened by an agency staff which takes the time to explain the basis for program policies and practices. Realistic guidelines and manuals, cleanly written and widely distributed, can do wonders.

The most effective links between the federal government and higher education are those developmental programs which recognize the need for (1) sound local planning prior to funding, (2) full funding, (3) well defined but broad guidelines which truly reward good local initiative, and (4) a representative peer group evaluation system, backed by an experienced and sensitive staff.

It remains to be seen if these desiderata can be applied so that more and more of our colleges and universities can be revitalized.

Let's pursue an example: Congress recently authorized formation of UPEP, a developmental grant program in USOE dedicated to the improvement of the "Undergraduate Preparation of Educational Personnel." Those now formulating the UPEP guidelines recognize that colleges and universities don't seem to know how to educate prospective elementary and secondary teachers. Most colleges and universities are engaged in the education of teachers but too little time and energy and talent is devoted to developing and putting into effect better mechanisms for preparing young people for the schools.

Establishing a research-based science of education which can tell us when students learn, what they learn, and how they learn requires time and much more attention than it now receives. But, surely, just as good technology often outruns the science which eventually brings understanding, our educational practices can be recast before we have a fully tested body of knowledge to justify our choices. Federal funding through programs such as UPEP can be of great assistance if applied to those institutions ready to commit talent, energy, and financial resources in coordinated ways to improve teaching and learning. The return—if measured only in graduates better prepared to enter pre-college teaching—can be immense.

Institutions are more likely to change in response to external pressure than in response to internal stresses and strains. One need cite only the changes that have been required by floods of students with widely varying backgrounds seeking access to higher education and by the pressures for improvement and growth stemming from public recognition that education is important.

Secretary of Education Needed

The federal government can make significant changes in higher education without producing undesirable side effects. I believe that it is time to build a federal structure which can

revive and reinvigorate American education. The importance of this task requires a Secretary of Education in the President's Cabinet, with the authority and the resources necessary to support the aspirations of American education.

I realize that a National Institute of Education is being formed but, so long as it is seen as a companion to a sagging USOE, it must be considered a palliative and not a cure. Even though the National Institute of Education may extend some of the functions of the Office of Education, it is likely that the result may be simply two agencies where there was one, with neither having the strength needed to do significant work.

The college and university community is frustrated because, as it has parted the ivy to look at the larger community, it has perceived that Congress and, through Congress, the agencies have chosen to offer a variety of short-term underfunded nostrums which, while they indicate some degree of concern, fail to recognize the need to rebuild our educational systems. One learns the virtues of pluralism when one deals with the federal government, but pluralism seems to have become a cover for lack of vision.

If federal programs continue to grow in number and complexity and confusion, we may expect to be further entertained by the spectacle of the various guilds and special constituencies fighting for support. As this support becomes obviously less useful and more expensive to accept, perhaps sanity will return.

GUIDELINES TO SANITY

What can be done to improve our educational systems in the years ahead? We can begin by agreeing that the ties between the federal government and higher education are permanent, and go on from there to perfect the relationship.

Let's examine the mechanics of present support programs. I believe that the proposal as a basis for judging a particular project will continue to be valuable. Despite the fiction that a master of the prose arts, a grant swinger, can make a plausible case out of moonbeams, good proposals reflect good local planning and contain sound answers to questions which concerned reviewers may expect to ask. The written proposal, subject to external review, could well become more common in the internal competition for resources as college and university budgeting processes become more public.

Nearly all federal agencies know that they will get better proposals if they take pains to issue widely and in timely fashion well-written, comprehensive guide-lines which do not stun the reader but rather enlighten him on the purposes, practices, and policies of a particular program. The principal danger then becomes oversimplification carried to the point that proposal preparation becomes a true-false test.

Once a proposal has been submitted, it is the receiving agency's responsibility to acknowledge receipt promptly and to begin the review process expeditiously. Once a decision has been made on the proposal, the agency is obliged to notify the applicant and, if the decision is favorable, to send a letter of acceptance outlining clearly the conditions of award, and including the detailed budget for the project. Copies of letters of award (as well as all pre-grant negotiation documents) must go to those concerned, in particular to the project director at the institution and to the institutional official who endorsed the original request.

If a proposal is denied, the agency should offer to provide, on request, a detailed critique, preferably by telephone, outlining ways in which the request might be improved for subsequent resubmission. Open discussion of the flaws in denied

proposals is a valuable service which only agency officials can provide.

Guidelines for similar programs within the same agency or in different agencies, and requirements for reporting both in programmatic and fiscal terms, vary widely from program to program. Task forces within HEW and other groups are working to reduce confusion on matters of grant administration. Variations in the treatment of indirect cost reimbursement and variations in the kinds of data required and in the formats for reporting data should be reduced within the next five years. Some consolidation of overlapping federal efforts can also be predicted.

The costs of handling federal monies have never been fully delineated, but those of us who work every day with grants and contracts know that these costs are substantial in time and talent. Many an institution new to the grant and contract business has found out quickly that it requires the full-time service of several accountants just to keep track of a small number of awards, involving as this does such chores as maintaining files and records, preparing cash flow requests and fiscal reports, and responding to the federal auditors who ultimately descend on everyone.

Rhetoric Should be Supported

Enough of housekeeping—let's go into more difficult areas. For example, institutions are surprised to find that federal agencies seldom ask for solid evidence of institutional commitment to patterns of change as a part of grant agreements. There seems to be every reason for insisting that implied institutional commitments to change be expressed in explicit terms in grant agreements and thus in the internal allocation of resources. Not only would the quality of proposals improve, but the number submitted would lessen since it is easier to present rhetoric than to support it.

Effective management of federal dollars requires that the return on investment be reasonable. If I am to help in making a decision on whether an institute for teachers is to be installed

for the next three to five years in either Institution X or Institution Y, I would like to know a great deal about recent changes in curricula and staffing patterns of the preservice program for prospective teachers at these institutions. The degree of commitment to sound instructional approaches should be a central factor in the evaluation of requests, but in too many instances the appropriate questions are not asked.

It's time that we recognize the importance of strengthening, on a continuing basis, those intellectual communities we call schools, colleges, and universities. The origins of the relationship between government and education help us understand why, to date, priority has been given to the development of the research capabilities of particular sub-disciplines selected by national guilds. While the guilds have contributed substantially to increasing our fund of basic knowledge and raising the standards of graduate education, they must not be allowed to interfere with that vital sense of community which distinguishes a company of scholars from a collection of mobile grantees. Thus, while support for the research of individual faculty members is useful, research grants do not serve to develop sound institutions. What is called for is more developmental funding, coupled with committed local resources and backed by increased semi-categorical institutional support.

If this view of the proper means of developing the strength of individual institutions is persuasive, it seems evident that development of inter-institutional cooperation—particularly where the improvement of elementary and secondary schools is concerned—can follow comparable pathways. The patterns currently used in the School-College Cooperative Program and in comparable programs in the U.S. Office of Education suggest that the limited experiments carried out to date should be extended and placed on a more permanent basis. What is required, in addition to money, is a selection process which offers support only to those institutions which have completed planning (including internal approval of these plans) and which can sustain the improvements with local resources once the period of grant support is ended. The resulting product—a sound plan for change, tested against

informed views of local capabilities and national needs and supported by permanent changes in the local allocation of resources—is the best way I know to assure that the public interest is being served.

Most importantly of all, we can convince Congress that strengthening institutions of higher education and school systems requires multiple-year funding of carefully worked out developmental approaches. Congress suspects that appropriating and granting funds on a short term basis is wasteful, especially when accompanied by periodic dismantling of ongoing programs in order to put the pieces together into more modish packages. Legislators do recognize that agencies and institutions can be more effective if they are free to develop modes of operation reflecting local concerns and local strengths.

The present disarray in relationship with the federal government will not be reduced until the educational communities have agreed on what is wanted and needed. Unless we can work out a consensus before we go to Congress, we can expect nothing more from Congressional action than the chaos we are now enduring.

THE LONG-TERM PROSPECT

In the years ahead, educational opportunity will be available to all segments and all age levels of the populace. With our society becoming more complex, a substantial effort to raise the level of educational attainment of the citizenry is inevitable. As more institutions move to open admissions, and as the range of curricular options is increased, educational access will be tied to motivation rather than to socio-economic status.

The public community colleges will consolidate their position by giving much more attention to training for a variety of new technical and semi-professional roles in the society. Self-paced, modular units of instruction open to both the apprentice and the old hand on an as-needed basis will become common.

Occupations that now require little or no formal educational background for entry or for advancement will strive for greater status, so that completion of some basic post-secondary training and educational regimen may be a common requirement for certification as a master carpenter or a police corporal.

Many of the adults in educational systems will be pursuing general educational sequences, perhaps working on external degrees as part of an open university, while others will be enrolled in programs of planned development for professional, technical, and executive personnel supported by industry and business.

Mid-career training and mid-career changes in occupation will become common. The sabbatical leave, until now largely limited to the college and university faculty member, will be extended to encompass the professional and semi-professional in other areas. (Some school systems already offer sabbaticals to elementary and secondary teachers, and the federal agencies have extensive systems for staff training and retraining, including sabbatical leaves, exchanges, and fellowships.) Federal funding for retraining of those dislocated by technological change will be routine, with this sort of support written into union contracts negotiated by employees in sensitive industries.

The effort the federal government has made in retraining of

elementary and secondary teachers through institutes and short courses will be ended as more and more teachers' unions build sabbatical programs into state-wide contracts. As professional standards follow salaries upward, the ad hoc training of groups of teachers will be replaced by individual pursuit of graduate and professional degree programs.

The book will not disappear as an instructional device, but one can expect increased use of cable television hooked to national networks and consoles linked to large central computers. Because the individual school system cannot deal with the software needs of automated teaching devices, and with more and more learning credit going on in the shop, the office, and the home, industry and business will become more active in educational development and marketing.

One consequence of greater educational access will be that the issuing of credentials for the professions and paraprofessional occupations will be by common agreement removed from the colleges and universities and placed in the hands of specialized agencies, long before 2001. The practices current in the medical and legal professions will be improved and extended to many other fields. With increasing avenues open to professional status (including credit for on-the-job experience and independent study) and with greater diversity in student backgrounds, the assessment of credentials will be done by specialists. Colleges and universities will avoid the conflict of interest involved in preparing students and then certifying them as prepared. While this change may reduce the flexibility of individual departments and of individual institutions, more will be gained than lost if means of measuring competence can be developed which are sound. Perhaps the artists and the athletes will show us how to do it.

Credentials Subject tc Review

Once issued, individual credentials will be subject to review and renewal periodically. This process, coupled with retraining opportunities, will insure that each professional will maintain the ability to do what the original certificate said he or she could do.

New and quite different methods of financing for higher education will be developed. The patterns to be used are not clear, since there are many unanswered political and technical questions. Some of the representatives of the private colleges are suggesting that a principal source of funding in the future will be deferred payment of full instructional costs, with each graduate pledging a small percentage of his annual income for periods of 20 to 30 years.

Public colleges and universities, especially the land grant group, have dubbed this approach the "student life indenture plan (SLIP)" and are calling instead for increased direct support from state and federal governments, with tuition charges reduced to zero. I think that the land grant colleges will win, mostly for political reasons. Tuition charges at both public and private colleges will be eliminated either directly or through "basic opportunity grants" to all students, regardless of family income.

The states will support both public and private institutions with appropriations based on sophisticated procedures backed by better information systems. The differential costs of educating various kinds of students for various goals will be more fully recognized in appropriations and budgeting.

The federal role will become one of helping the states raise revenues needed for education (as well as for other state services) while dealing directly with the education community in providing project funds for implementation of planned improvements. The federal emphasis on developmental funding will support the building of new or remodeled facilities; the installation of additional curricular options and improved management systems; and the recasting of existing programs as times and staffing change. Perhaps 50 per cent of this developmental funding will be formula-based and semi-categorical, requiring no proposals but rather complete reporting of uses. The rest will be in categorical grants issued after competitive review of proposals submitted under relatively broad guidelines. We will have learned to appreciate the elegance and cost-effectiveness of simple mechanisms.

Funding for elementary and secondary schools will be handled mostly on a cooperative basis, with the state and federal governments contributing to operating support and working together on the evaluation of competitive requests for categorical developmental support under a peer-review project system. The property tax will be replaced by state or regional graduated income taxes, provided for by a line or two added to the federal IRS form.

The processes for internal allocation of resources in educational institutions will be greatly changed; present mechanisms designed by accountants on leave from the Mafia will collapse as various public groups gain access to the bases for decision. A new institutional public, the faculty and staff union, has already begun the battle.

More Unionization of Faculties

The faculty member who does not belong to a union will be an oddity. Negotiations between faculty and administration will have become state-wide for public institutions and consortium-wide for private colleges, most of which will belong to organizations such as the Associated Colleges of the Mid-West, or the Great Lakes College Association. With unionization of faculties will come the appointment of more administrative professionals, since faculty will be so costly that institutions will use specialized staffers to provide as many services as possible. In time, of course, these administrative professionals too will unionize, although that movement will come later than unionization of faculties.

Basic research and graduate training will continue to be the province of the university. The growth of large research institutes separated from the universities is unlikely, since most research people prefer university community life. Federal support for research will be separated from support for graduate students. Institutions will regain the initiative to determine which students to support, how to support them, and when to support them.

The colleges and universities will control much of the funding for research, using local resources and semi-categorical research grant funds from the federal government. Some direct federal project support will be available, with most of it going to teams of faculty and students engaged in research on cross-disciplinary problems. Before it supports research, the federal government will ask how the expected results relate to particular national needs. One federal goal will be the development of indicators of the health of our society, including measures of the outcomes of educational processes.

The Congress and most state legislatures will approve multi-year appropriations for most agencies based on reliable projections of income and need. Each agency will know what it has in the way of resources well before the beginning of the fiscal year in which the funds are to be used.

Much of the needless confusion created by a multitude of agencies and program units dealing with similar concerns will have disappeared. A Secretary for Education, supported by a high-level advisory group drawn from all levels of education and from the general public, will supervise the work of six or seven operational agencies, each monitoring a particular segment of the educational system. Each unit will have the authority needed to build a professional staff and a small set of first-rate programs.

The principal functions of these operating agencies will be (1) *competitive funding of institutional development projects* seeking both quality and diversity; (2) *periodic distribution of semi-categorical funds* to support research and development, and preparation and distribution of reports on the uses made of these funds; (3) *research and evaluation* (some by the agency staff and the balance through grant support of external groups), including basic studies, analyses of current educational practices, and reporting on educational inputs and outputs; (4) *monitoring of manpower studies, credentialing, and efforts to develop social indicators* so as to provide planning data for the schools and colleges as well as for students, the general public, and Congress.

The various guilds, constituencies, and semi-lobbies that presently attempt to represent higher education will have been molded by time and by necessity into a coherent force which can articulate our common goals. The Executive Branch of Government, Congress, and the various State officials and State legislatures will be able to get professional advice not influenced by narrow special interests.

If all the foregoing seems utopian, be reminded that our achievements are limited by our aspirations. If we act as if the future can only be the present extended, we forsake our heritage and we deserve "nothing but praise."

THE ECONOMIC SYSTEM AND THE SCHOOL SYSTEM

EDUCATION AND THE ECONOMIC PROCESS[1]

Kenneth Boulding[2]

Formal education is only a part, and perhaps not even the largest part, of the total learning process which goes on in society. It is this total learning process which underlies the whole dynamics of human history, and the whole process of evolution. What is happening in society at the present time is the result of a continuing process of learning which has been going on for several billion years. The only thing which can evolve is knowledge. It is a fundamental fact that mass and energy are conserved; knowledge is not. The education process began, in a sense, when the hydrogen atom learned how to take another electron and become helium. This has been going on ever since.

By far the most important characteristic of the state of human society, at any moment of time, is the stock of knowledge and its distribution—what Pierre Teilhard de Chardin calls the *noosphere,* this gossamer sphere of knowledge that encircles the earth and is now primarily contained in human organisms. Atlhough the other animals have some, quantitatively we have a near monopoly of it.

This *noosphere,* however—this stock of human knowledge—is constantly being consumed by aging and death. Death is an enormous consumer of human knowledge: all human knowledge is lost every generation. By that, I mean the kind of knowledge which a man has acquired and made his own, not handed down in writing. All the libraries in the world, without somebody to read them, would do little good. Knowledge is appallingly fragile, and is constantly being consumed and has to be replaced by the total learning process. The learning process not only replaces

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[1] This article is reprinted from *The Alternative of Radicalism: Radical and Conservative Possibilities for Teaching the Teachers of America's Young Children,* a report of the fifth national conference of the USOE Tri-University Project in Elementary Education, 1969.

[2] Boulding, a professor of economics, is associated with the Institute of Behavioral Science at the University of Colorado, Boulder, Colorado.

what death destroys, it adds to what was there before; it has been adding to it at an accelerating pace in the last few thousand years.

The Paleolithic was a period of human development when very little further knowledge was being "added to" the knowledge which then existed. The astonishing thing about the Paleolithic to my mind is that, according to the anthropologists, creatures with the same genetic constitution as ourselves were able to stay in a stable state of culture for nearly two hundred thousand years. This happened partly because they didn't live very long. The average age of death in the Paleolithic was somewhere between twenty-five and thirty. If there is no one over thirty, knowledge grows very slowly. Every generation in recent historical time has increased this stock of knowledge a little. And even in the Paleolithic, there must have been *some* increases in knowledge; the cave paintings suggest this. But where a civilization is as vulnerable to disease and epidemics as was the Paleolithic, where there is short life-expectancy, then knowledge is easily lost, as there is no one "old" around to transmit experience to the next generation. And if knowledge is not transmitted to the young, it dies out—in one generation.

Education Most Crucial Activity

Thus education, and especially formal education, is the most crucial activity of society from the point of view of its continued existence. If it were not for formal education, society as we know it would simply disappear in one generation. One of the problems of education is that, as I am suggesting, we know practically nothing about it; we know practically nothing about human learning. The human organism is an almost inconceivably complex apparatus. We start off with some ten billion neurons—I understand we lose a hundred thousand a day all our lives, but we still have a lot of marbles left even at the end. An organization of this degree of compexity is far beyond the capacity of our explicit theoretical models. We don't really know much about the physiological basis of memory, and much of what is written in this field consists of imaginary physiology. We know something

about teaching and education at the level of what we might call "folk knowledge" (we have been teaching people for quite a while; we must know something about it, and it seems to work in some mysterious way); but we don't have much *formal* knowledge about how men learn. The knowledge stock is passed on from one generation to the next, and it is increased generation after generation; but nobody really knows how we do the increasing or the passing on, and both may be done more by good luck than by good management. Finally, we just don't know much about the relation between the inputs of information into the human organism and the building up of the knowledge structures out of this information.

Emboldened by the prevailing ignorance about how we learn, a simple-minded economist may try a few propositions about human learning. I want to try to suggest how an economist might look at human learning—not how a psychologist would look at the same phenomenon. Psychologists know a lot about rats, but they don't know as much about people. As an economist I come in where angels fear to tread.

I have five points. First: *The learning of facts and the learning of values are closely interrelated and are part of essentially the same process:* that is, as we build up our image of the world, this image develops a value structure so that we rate certain aspects of the image more highly than others, and the valuing of these aspects is very largely learned, as our image of the world is learned.

Practically No Human Instincts

The new baby has a few genetic values that are innate. It likes mother, it doesn't like being wet, it doesn't like loud noises, and it doesn't like falling. After this point, its behavior and attitudes are acquired until it ends up liking sukiyaki or doing something that isn't innate at all. The more we look at the learning process, even in the lower animals—the monkeys for instance—the more it becomes clear that there are practically no instincts. There is practically no such thing as "human nature." (I don't believe in nature at all. I think anything that's any good is arti-

ficial. The natural world is wet, damp, cold, and uncomfortable, and we obviously want to get away from it as soon as we can.) Man is an artifact; he is his own artifact. Each one of us here is an artifact, more custom-built than a Ford car, but still an artifact. We have been produced by our experience, by our society, by the enormous information input that we have had, and also by our own capacity for producing information internally.

Perhaps the most extraordinary thing about the human organism, aside from its capacity to "take in" an enormous amount of information, is that it is so complex that it develops a vast internal output of information *into itself:* that is, the imagination. We are now beginning to understand that perception is very largely learned. The outside world does not simply "imprint" itself on our minds, but our senses act as a critic of the imagination; the mind is in no sense a *tabula rasa;* it is an enormous great burgeoning windmill of images and impressions and ideas and imaginations. *Imagination is the key to perception;* and *perception is only a critique of the imagination.* We are all imagining all sorts of things here. Our eyes and ears are telling us that about ten thousand of them are untrue. This process of checking image against perception is a continuing one. The fact that it is going on all the time again illustrates the incredible complexity of the human organism.

Second, knowledge—what we see, what we allow as "input"—grows toward "imagined" payoffs. *It grows toward the more highly valued elements in the potential image.* We see the world the way in which we do because it pays us to do so. (My favorite illustration of this comes from astronomy. Only astronomers under twenty-five have ever seen the canals on Mars. It is the old astronomers whose eyes are not quite so good who have the jobs and who have the power, so that if a young astronomer does see canals on Mars, he tends to dismiss them as illusions. The space probe suggests that they *are* illusions—but they might not have been.) Our whole image of the world grows in the directions that we think are going to pay off.

Third, because of this second principle above, *the fundamental key to understanding the human learning process is*

evaluative feedback, as to the rewards or the disappointments of certain intellectual actions. The real key to the learning process is to make the perception of failure rewarding, for only the legitimation of failure allows "perception" to modify our images. The main reason for the success of the scientific subculture in the last three hundred years is it was a subculture which legitimated failure. It was all right to do an experiment and have it fail, whereas in political life, and I'm afraid all too often in religious life, anything which fails is automatically concealed. This sort of concealment is antithetical to the learning process in that the learning process consists of "learning from failure"—allowing a perception or action which fails to fulfill your expectations to modify your image of the world. Success teaches you that the world is merely a reflection of your own preconceptions.

High Value on Learning

Fourth: *for the learning process to continue, the individual must himself place a high value on the learning process, or he will stop learning altogether.* If the learning process requires both a "pay off" and "failure," it is obviously quite complicated. An enormous number of people stop learning at an appallingly early age. A great many of our educational institutions seem even to encourage this, especially the institution of "the Ph.D.," which is all too often a device to keep people from learning thereafter. This educational pollution is a critical problem, as it means that the present education system too often produces knowledge which isn't knowledge and people who are not capable of learning in the future.

Consider for a moment this dilemma, implicit in any effort to provide evaluative feedback to the person who is learning. How does one ensure that an activity or experiment does not result in *negatively valued* feedback? For example, if someone goes to where he thinks the post office is and it isn't there, he has failed, in one sense. He has received "negative" feedback. But it may not be *negatively valued.* Such disappointment can produce one of two effects. It can teach him that he has made a mistake and should correct it, or it can teach him that he is no

good and will always make mistakes—that he is incapable of correcting his mental picture from experiences. The distinction between these two responses is very fine, but one stimulates learning and the other leads to some destruction of the personality.

If we try to identify the places in our society where education seems to be destructive—and there are such places—we are going to find that we have gone over this fine edge, giving the kind of evaluation that destroys the personality instead of destroying the mistake. It is a very difficult line to define and to perceive. In the schools I feel we are always treading this tightrope. The child makes a mistake; the good teacher explains it in such a way that the person or identity of the child is not threatened by this. And the bad teacher says, "Oh, you're always doing that. You're no good."

However, the fact that we *do* succeed in passing the knowledge structure on indicates that we must be doing *something* right. Obviously, what we are doing cannot be all destructive. And the American system is certainly more humane than the British system in which I grew up, which is a (fortunately inefficient) design for the narrowing of the personality into a straight-jacket of arbitrary propriety.

Family Important in Education

Furthermore, in evaluating educational systems, we must also remember not to neglect the other aspects of the total learning process. The family, for instance, is an enormously important institution offering education. We know far too little about the processes of education in the family. To what extent is father necessary, to what extent is he a good riddance? It depends on the man, obviously. There are many areas here about which we need to know more.

Fifth, and very obviously, *the economic system affects the educational system, and the educational industry fits into the economy and does things to it.* Let me try to suggest how two of our concerns in economics particularly apply to education: we are

concerned with how society is organized through exchange; and we are concerned with scarcity and what to do about it (although other institutions and other social sciences are also involved in handling scarcity).

Scarcity is one of the basic underlying "environments" of human life. The fact that we only have twenty-four hours a day has introduced scarcity into human life right from the beginning. Every time one chooses a certain activity, another kind of activity is being neglected: this is scarcity. In the learning process there is no "economy of abundance," when the necessity for choice is so fundamental. And insofar as the learning process involves the use of scarce outside resources, economics is involved.

Economics should be very important to the study of formal education. It is a serious challenge to the economics profession that, until now, we have invested very little in the economics of education (e.g., compared with our investment in agricultural economics). An enormous amount of time and energy has been given to the economic study of agricultural production functions, for example, whereas the input-output relations in education have been comparatively neglected. I can count the well-known educational economists almost on the fingers of one hand; a study of the indices of economic publications will show a marked discrepancy between the large number of publications which are put out in the field of agriculture economics (agriculture even now amounts to only five per cent of the Gross National Product) and the small number of publications which exist in the area of the economics of education. This is something I hope we may be able to rectify in the next generation.

Education in 'Grants' Sector

In the manipulation of scarcities, one of the great problems of the economics of education today is that a large part of it is in what I have been calling the "grants" sector of the economy rather than in the exchange sector. If we contrast, for instance, the educational industry (which is now about seven per cent of the Gross National Product), with, let us say, the automobile in-

dustry, we see that the automobile industry is almost wholly in the *exchange sector* of the economy, whereas education is largely supported by the one-way transfers through taxation—it is in the *public grants sector*. The grants economy has been rising quite rapidly in the United States, from about three per cent in 1910 to somewhere around thirteen per cent today. Nevertheless, it is not indefinitely expansible. The total of grants, both public and private, is a function largely of the sense of community, for a grant is a symbol of identification between the grantor and the recipient.

The educational industry today is facing an increasingly severe economic crisis because of the fact that it is growing larger all the time and is really outrunning the capacity of the grants economy to support it, as witnessed by the increasing failures of voters to approve school bonds and millage increases. The educational industry is likely to grow almost as far into the future as we can see, because, as the stock of knowledge increases all the time, the amount of resources which have to be devoted to transmitting it from one generation to the next must likewise increase. Knowledge now approximately doubles every generation. In the Paleolithic age, it perhaps doubled in two hundred thousand years; and in what I think of as the "age of civilization," now coming to an end, it doubled possibly about every thousand years. This means that the cost of education is going from seven per cent of the Gross National Product to eight per cent to nine per cent to ten per cent to eleven per cent to twenty per cent; by the middle of the next century it will probably be twenty-five per cent. Eventually the increase in knowledge will come to an end. I expect the whole scientific revolution to come to an end within the next thousand years, simply because there will then be so much knowledge that we will have to spend all of our time transmitting it and there won't be any time left over for research.

Educational costs also grow because education is a technologically stagnant industry. In an unprogressive industry the price of the product continually rises, because people in the unprogressive industry are paid as much as people in the progressive ones. The unit cost of education therefore continually rises

and the total cost of education grows for two reasons: the physical size of the industry grows, and the cost per unit and so total cost as a proportion of the Gross National Product grows because of its lack of technological progress.

Feedback Slow in 'Grants' Economy

One of the differences between the grants economy and the exchange economy is that the feedback in the exchange economy is pretty fast, whereas in the grants economy, it is either very slow or non-existent. If the Ford Motor Company produces an Edsel, it very soon finds out. If the Ford *Foundation* produced an Edsel, nobody would ever find out. If the Department of Defense produced an Edsel, nobody would find out until after we were all dead. The weakness of the information feedback is a grave general weakness in the grants economy. And we see this in education also. There is very little feedback from educational expenditure, and therefore, little learning about how it is to be made more productive.

All the measures of educational productivity and the productivity of teachers are grossly inadequate. The current crisis in the financing of education is directly related to the state of the international system, since the grants economy also includes the defense economy. I have just seen a very interesting paper which suggests that every dollar of increase in the defense budget comes mainly out of education. The Department of Defense is much more like the Ford Foundation than the Ford Motor Company; it is more like the Catholic Church than like General Motors. It's essentially a quasi-religious organization. It is not in the exchange economy, but in the grants economy, and this is an "economy" in the sense that the total of grants is limited, so that a grant to one sector usually means no grant to another. The growth of Defense is the principal threat to education today, and an expansion of the defense budget nearly always results in a failure of the education industry to expand. This is why educational progress is thwarted.

Given what is happening in the national and international community, it may be increasingly necessary to get education

out from under the grants economy and to put it more and more in the exchange economy, through some device such as educational banks which will explicitly recognize the fact that education is a good investment and lend money to any or all qualified students, to be repaid, for instance, by a surcharge on their future income tax.

For a while it was thought that education was the principal requirement for economic growth. But then it was realized that many people do in fact invest in the wrong kinds of education, and we now see that education is only a key to economic growth if people invest in the right kind of education. On the other hand, there is a great deal of evidence that the "right kind" of education is a good investment for the average *individual.* He will earn more income as a result. But what is a good investment for the individual as well as the community can safely be put into the exchange system. Hence, I am in favor of having all educational institutions charge the full cost of their education to the student. I'm greatly against a hidden cost in education. If it costs $20,000 a year to make a doctor, then the student should be charged this amount. As an economist, I do not believe that anything that is costly should be free and I don't think any of the best things in life are free. Then, where it is necessary to subsidize education—as it is—we should subsidize the *student,* not the school.

Private and Public Should Compete

This logic also suggests that private and public education institutions should be free to compete on equal terms. There is no reason why education should be a public monopoly. I am in favor of having public enterprise in education. I am not in favor of abolishing the public schools (i. e., presently tax supported) as some of my more extreme colleagues on the Left (or Right) are. There is a great deal to be said for a system in which one can have a variety of education institutions that can compete with one another, and under an educational bank proposal this could be done. The people for whom education is successful, in terms of giving them more income, will then pay more sur-

charge on their income tax than those for whom it is unsuccessful; the estimate is that the amount would not be more than about one or two per cent. Failing some device like this, we may be in danger of a real economic collapse of the educational industry, which would be an enormous disaster for society.

A further important aspect of the educational economics concerns the distribution of educational opportunities. *There is a great deal of evidence that the persistence of the poverty problem in this country, in spite of our successful economic development, is a result of the maldistribution of educational opportunities and indeed maldistribution of the whole learning process.* In a real sense both poverty and crime are learned in the subcultures which produce them. The present urban problem in this country is largely due to our technological progress in agriculture. We now have enormous numbers of first generation urbanites, and it seems to take three generations to learn to live in the city! Our urban crisis is the result of an essentially temporary phase in our society. In the future there is going to be less urban migration. Only seven per cent of the population of this country is in agriculture now, whereas, even in 1900, it was fifty per cent. And, in another generation, most of the people in the city will be second-generation city-dwellers. The degenerative social system in the cities is a problem peculiarly appropriate to the grants economy. Presently, we not only waste the grants economy on defense; we waste it on the rich and, hence, do not have anything to spare for the places where grants are really needed—the areas of the otherwise self-perpetuating "poverty" cultures and "delinquent" cultures.

Grants Usually Go to Rich

We do very little to improve education for the poor since education is still very largely financed by the local grants economy, and the local tax system. The central cities have not been able to expand into the suburbs in the twentieth century, in the way in which they did in the nineteenth century; the tax base of the city is continually declining, and, hence, there is a degenerative system in the cities. The only way to break into it is through

the grants economy, probably only through the federal grants economy. It is hard, though, to work the grants economy as it ought to work, because the people who give the grants are the middle class people such as congressmen, who tend to give grants in such a way that they go to the rich, and it is difficult to devise institutional devices which will make the grants economy efficient. This is where the guaranteed annual income, which is favored by both Left and Right these days, might possibly solve a problem.

A fascinating, but relatively unexplored, related problem is the relation of economic incentives to learning in the individual student. If learning moves toward payoffs, ought this to be reflected in devices for distributing money. Would people be ruined, for instance, by a guaranteed annual income? Traditional formal education relies very heavily on the "threat system;" on the other hand, a great deal of psychological experiment in this field suggests that the hope of reward is a far stronger incentive than the fear of punishment and that, indeed, punishment, insofar as it destroys an individual's self-respect, operates to destroy his learning capacity. It is an exciting idea to think of paying students to be "successful" or to fail in legitimated ways —in ways that would enable them to learn. At this point, however, I am merely competent to raise questions, not to give answers.

As we look at the problem of scarcities and of managing the cost of education, we need to attend to an important development in the economics of education, the significance of which is very hard to assess at the moment, i.e., the development of teaching machines and computer-aided instruction. *What is clear is that these technological developments must be evaluated in the total educational process conceived as a social system.* The value of a machine depends on the system in which it is embedded: machines are costly by comparison with human teachers; they do have a comparative advantage in patience and in providing the kind of feedback which is constructive rather than destructive. Teachers will need to observe this development very critically.

The last thing I have to say is that *the fundamental purpose of education is to create people, and the question is what kind of people.* We as educationists need to have some sort of image of the future, some sort of image of what the world is all about and what the world is going to be like, in order for us to produce an image of the kind of values which will be appropriate for the world ahead. What I think is happening in this extraordinary period of change and development is that we are moving towards what I (and Barbara Word) have called the "spaceship earth." It is very clear as we look at the world from space that the earth is a very small, crowded spaceship, destination unknown. We are in a precarious situation; it is possible that the evolutionary experiment in this part of the universe is going to come to an end; the transition from the old world to the new is, and will continue to be, a very difficult one.

Man on 'Spaceship Earth'

Up to now, a man has always lived on a psychological flat earth—a great plane—or a "plain where ignorant armies clash by night." But, on that plane, there has always been, for the defeated or the hostile or the venturesome, somewhere to go. We have never before really lived on a sphere. Now we are all very much aware that we live on a sphere, and a very small and crowded sphere. On a spaceship, the kind of values that are appropriate to the Great Plains won't work. There has to be a moral revolution. We certainly can't afford to have international war in a spaceship. We cannot even afford to have revolution in a spaceship. I am an anti-revolutionary because I think that revolution is too costly and too dangerous for a spaceship. We simply can't horse around too much. We have to learn patience—how to ride these dangerous and rapid evolutionary processes.

The great problem in the spaceship is pollution. We are beginning to realize this in the earth now. In a spaceship, there are no mines; there are no sewers. You have to eat your own excrement; let's be crude about it. You have to transform what you give out so you can take it in. You have to live in a circular flow. This will be as true of society as it is of anything else. Up

to now, we have always had social sewers. We spewed out the people that we couldn't use in society, into the slums and into the mental hospitals, even into the schools; we held them in a cesspool until they died.

In the spaceship, we cannot afford to do this. Just as we have to learn to reprocess sewage, we're going to have to reprocess human outcasts. This will require a lot of learning on our part, particularly on the part of the educational system. The great aim of education, in the next hundred years, has to be to create the human identity. No other identity will do. The Black identity will not do. The White identity will not do. It is not important enough. By far the most interesting thing about a Black human being is that he is human, and the same goes for any other color. Racial differences are biologically too small to build an identity around. There must, of course, be cultural identities. We must preserve and create diversity, cultural diversity, but that is a matter of informal culture. Black studies, like Jewish studies, or Catholic studies, should find their place in the Sunday school or its equivalent. I'm all in favor of a "mosaic society;" I don't want everybody to homogeneous; I don't want a uniform society as a kind of warm, thin, human pea soup. I want a society that is "dappled, original, spare, strange," as Gerard Manley Hopkins said. I want to have a society in which there are pink people, yellow people, black people, Seventh Day Adventists, Communists, Buddhists, and the whole great gamut of human variety. I don't want a uniform society at all. But, if we are going to have a mosaic society, it has to have some kind of cement. There has to be a frame to put the mosaic in and cement to hold the pieces together. This cement is the human identity—a basic loyalty to the human race, a basic loyalty to the spaceship. This, it seems to me, is what the educational system has not produced. In every country in the world, it is either illegal or immoral to be a human being. If the human race is to survive, then the educational industry, if an economist can call it that, has to take as its greatest task the creating of the human identity.